

# Update offshore grid

Workshop Offshore Wind Farm Zone  
Hollandse Kust

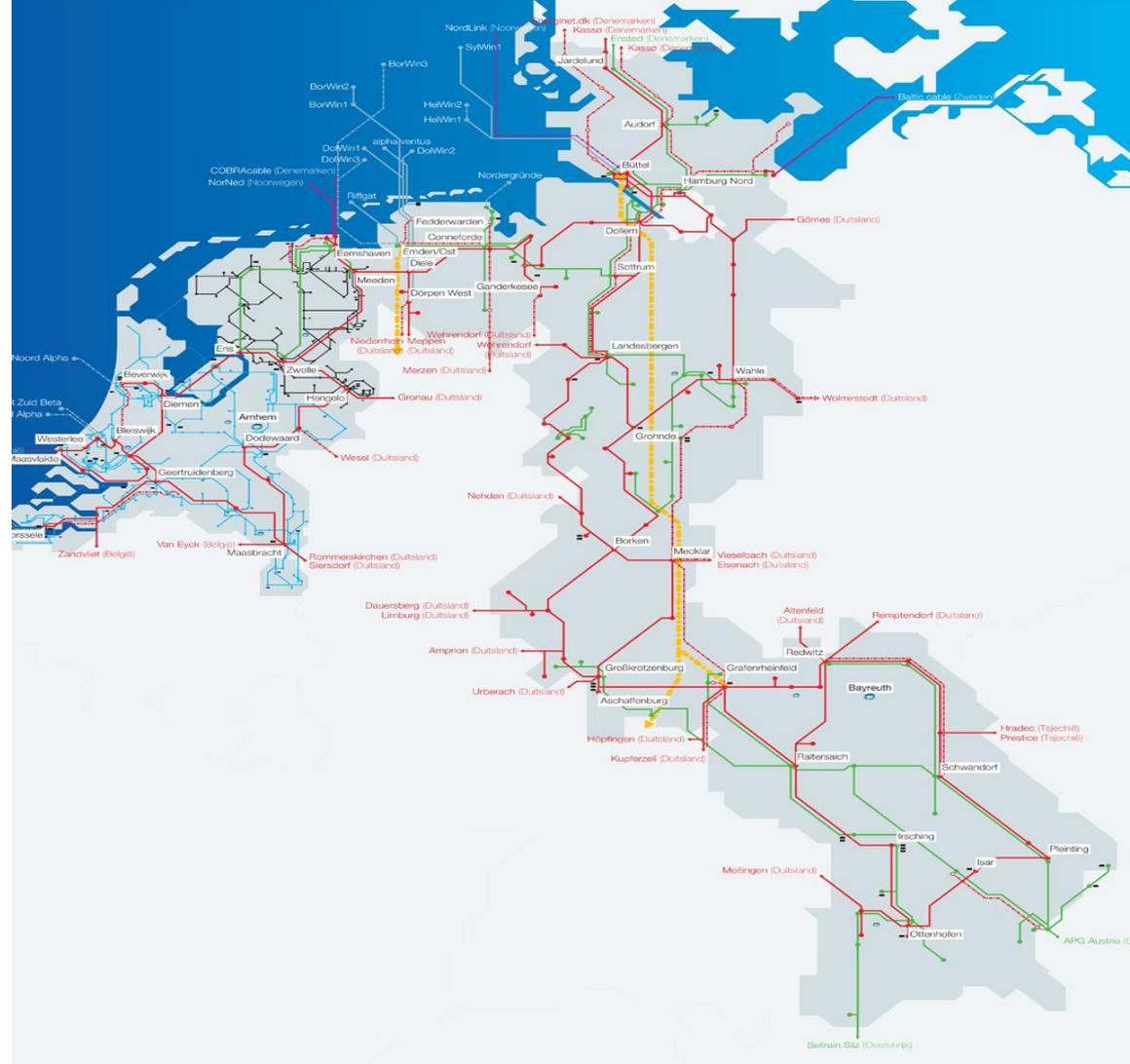
April-18-2019

C1: Public Information

Jaarsma, Saskia

# TenneT at a glance

- Europe's first cross-border grid operator for electricity
- Top five grid operator in Europe
- International offshore division
- 23.000 km high-voltage lines
- 4.700 km offshore cable
- 41 million end-users
- ~4.000 employees
- Asset base: EUR 20.4 bn
- Capex 2018: EUR 2.3bn
- Revenues EUR 4.2bn
- EBIT: EUR 800 mln
- 99,9986% security of supply

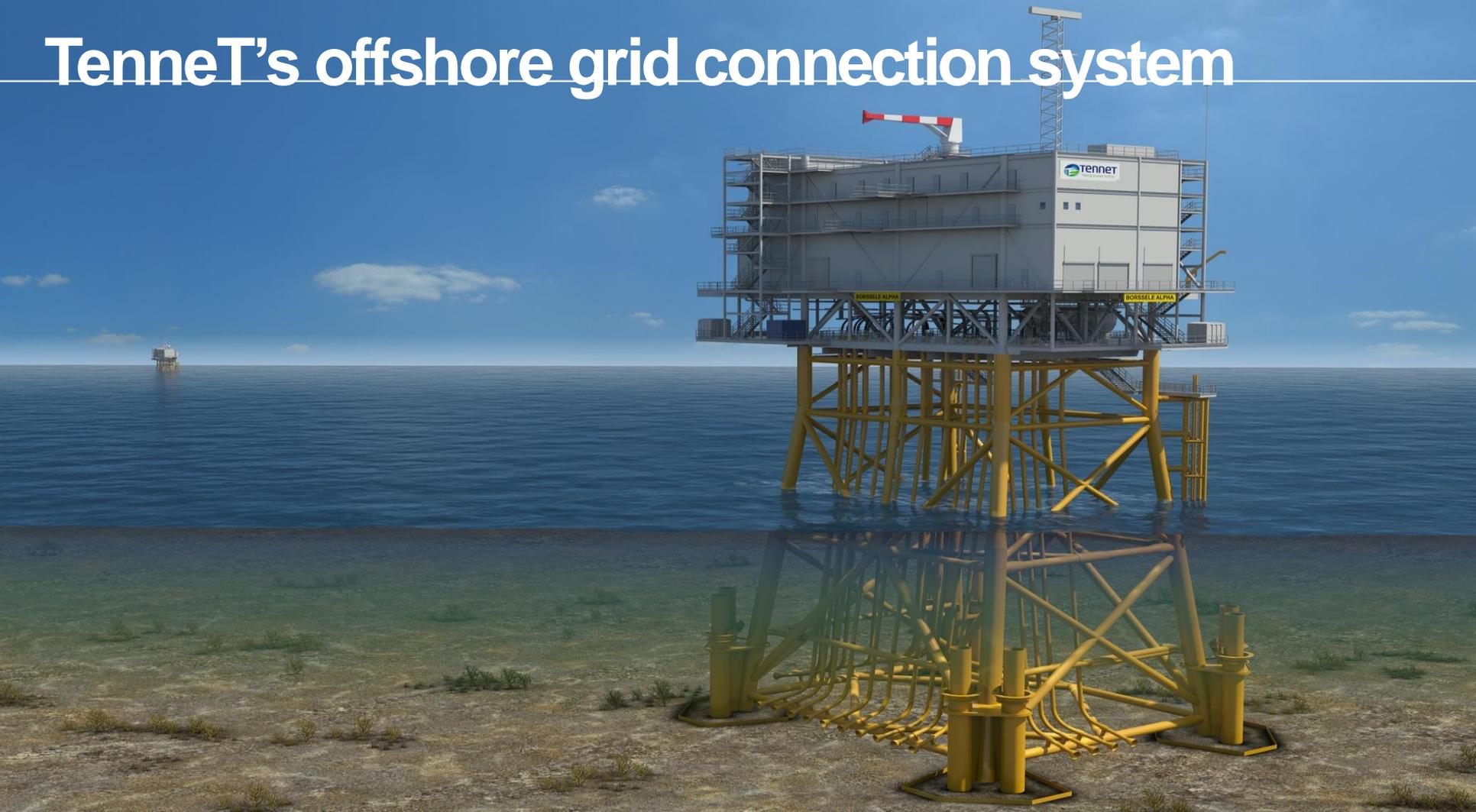


# Phase I: 2019-2023

- 3.500 MW: 5 x 700 MW
- Standardised AC concept
- Lean design
- Lowest possible LCOE



# TenneT's offshore grid connection system



# Enriched standard in 2018: Nature Inclusive Design



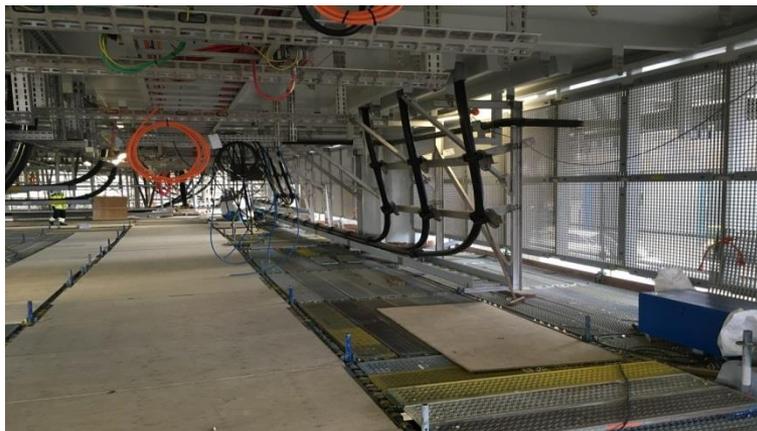
# Project update



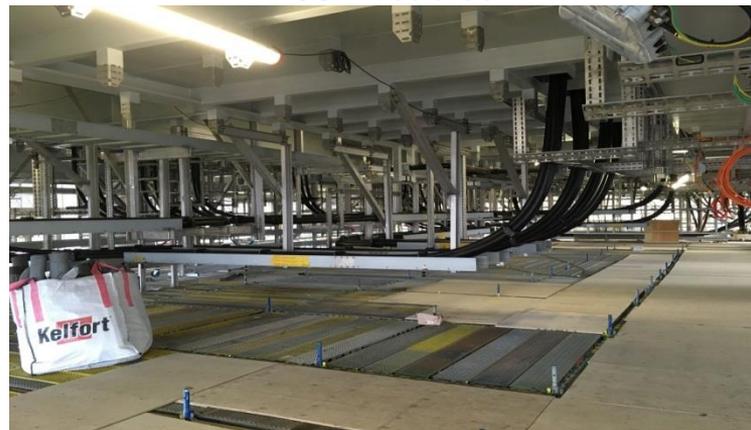
# Borssele Alpha



220kV cables



66kV cables



LV cables

# Borssele Alpha



Topside Alpha



Roof Deck



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Update offshore grid

Antenna Mast – installation



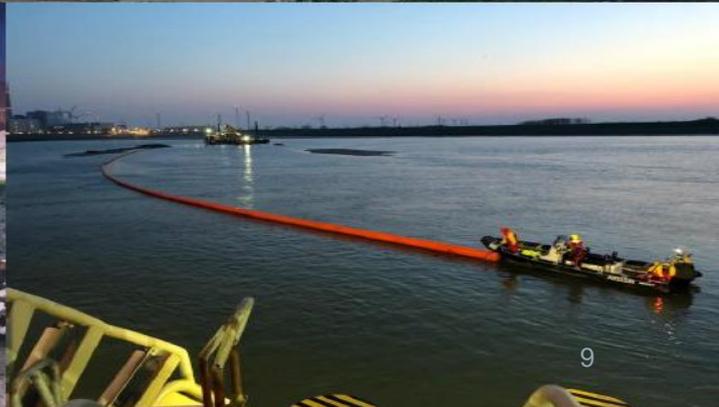
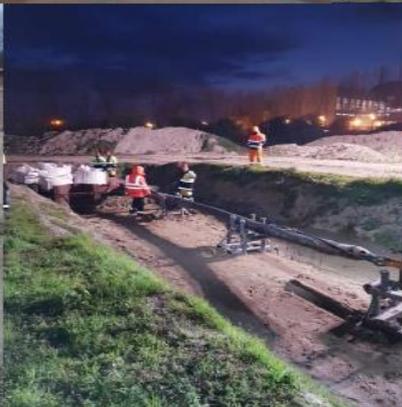
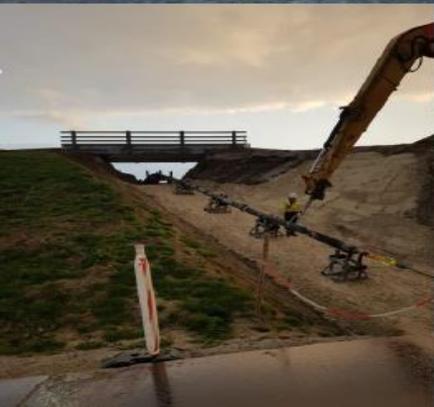
Main Crane installation



C1: Public Information



**Pull-in  
BA-20-10  
completed  
Saturday 13 April  
2019 at 06.00 hrs**





**Honte crossing BA-20-10 completed  
Sunday 14 April 2019 at 13.34 hrs**



# Borssele Beta



April-18-2019

Update offshore grid

C1: Public Information

# Borssele Beta



April-18-2019

Update offshore grid

C1: Public Information

# Hollandse Kust (zuid)



Coast landing Maasvlakte: Preparatory activities at Maasvlakte for onshore station and HDD 220 kV cable drilling.

# Hollandse Kust (zuid)



# Hollandse Kust (noord)



# Phase II: 2024 - 2030

- Continuation near-shore 700 MW AC concept
- Introduction new standard far-shore 2GW HVDC concept



| Planning  | Capacity | Wind area                         | AC / DC |
|-----------|----------|-----------------------------------|---------|
| 2024/2025 | 1,4 GW   | Hollandse Kust (west)             | AC      |
| 2026      | 0,7 GW   | Ten noorden van de Waddeneilanden | AC      |
| 2027/2030 | 4,0 GW   | IJmuiden Ver                      | DC      |

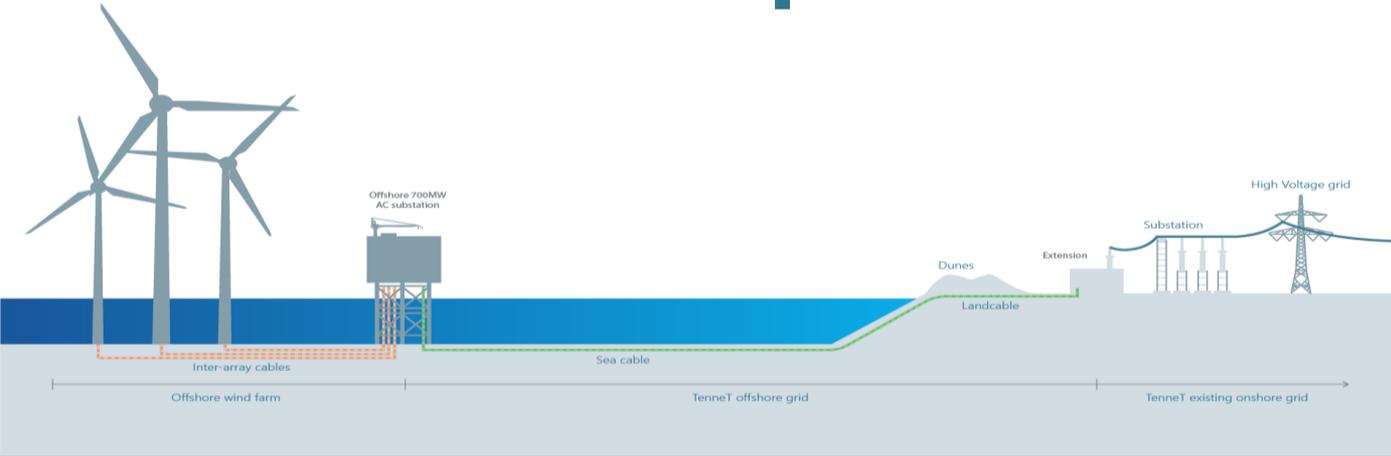
# TenneT connecting +6,1 GW



- Drivers in the development of the new grid concept:

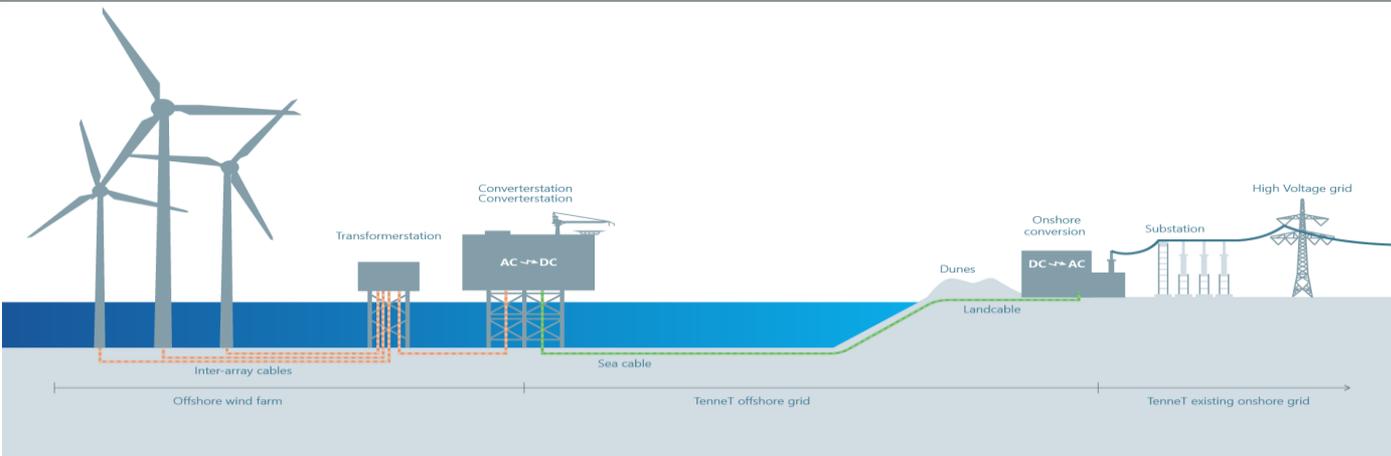


# Current concepts



## 700 MW AC platform

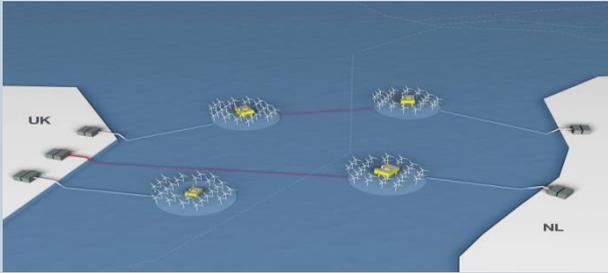
- 700 MW
- Near the coast



## DC platforms in Germany

- Up to 900 MW
- 320 kV DC cable
- Separate offshore platforms

# Innovations



WindConnector



Connecting Oil & Gas platforms



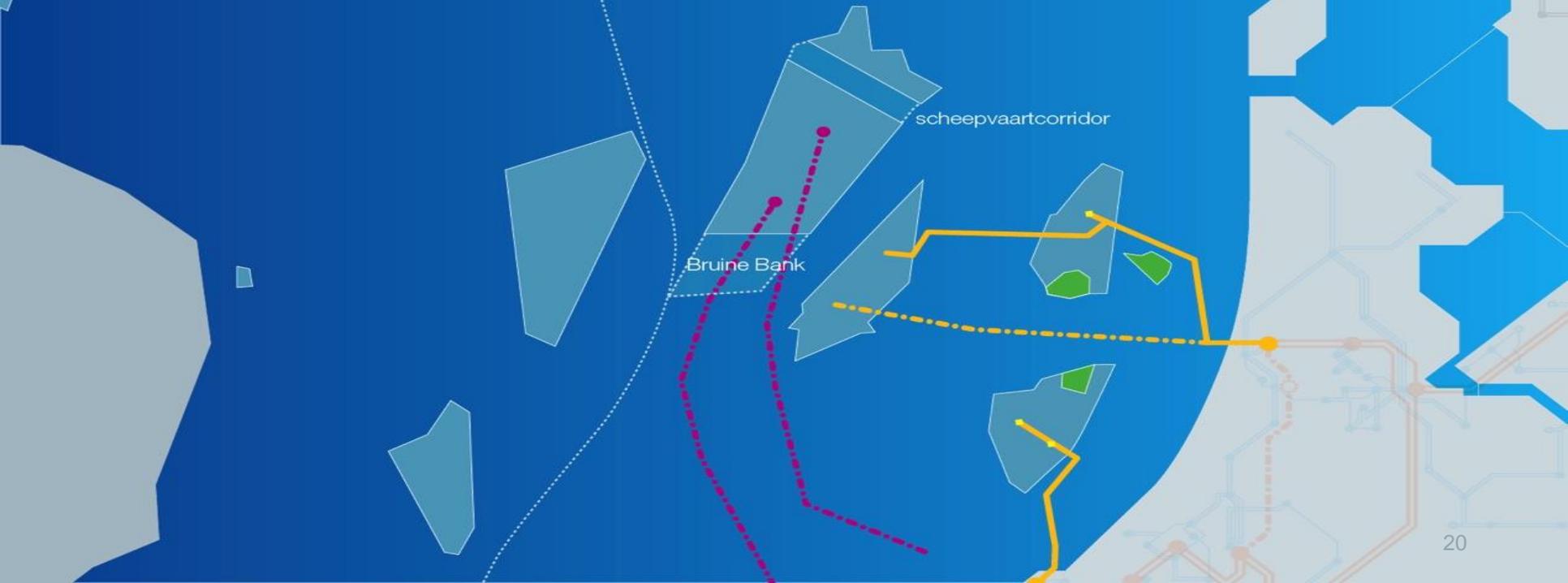
Platform or island



Additional offshore wind

# Grid concept IJmuiden Ver Animatie Platform

<https://www.youtube.com/watch?v=1sYmeNAUc2A>

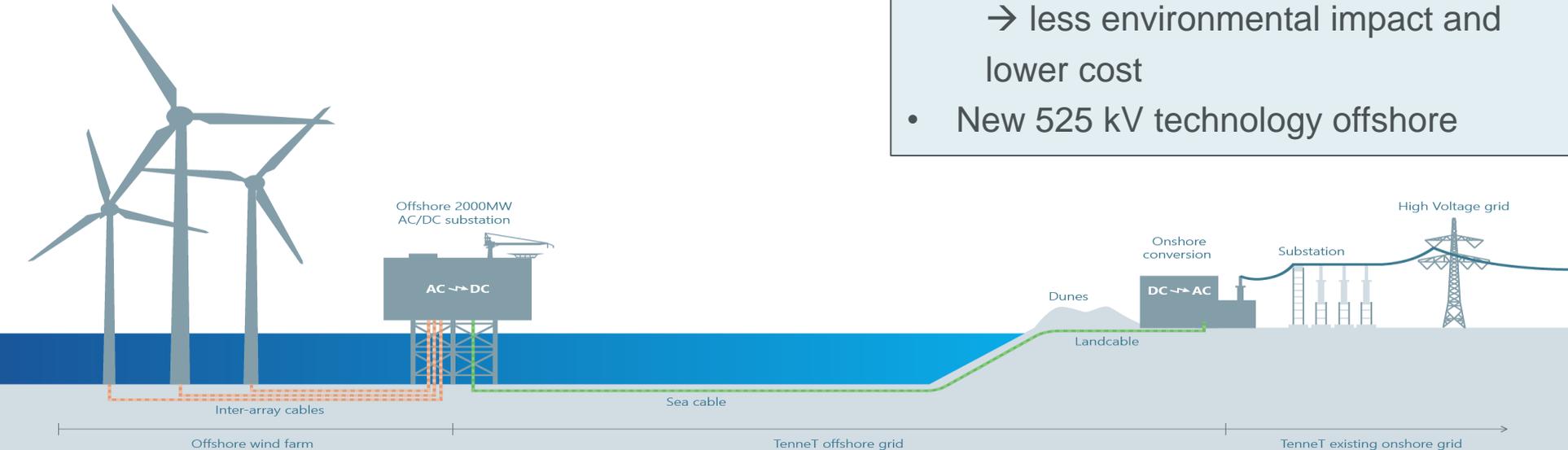


# Grid concept IJmuiden Ver



## DC platform IJmuiden Ver

- 2 GW connections
- Less cables and less platforms  
→ less environmental impact and lower cost
- New 525 kV technology offshore



# Mutually developing the 2 GW standard



The previously successful consultation process with early involvement of offshore wind farm developers will be applied for the further design of the 2 GW standard.



Start consultation process April 2019

# Thank you for your attention!



# Disclaimer

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**Taking power further**

